WHAT IS CLAIMED IS:

1. A mandrel comprising a top surface, and an outer surface comprising a plurality of ridges and contoured surfaces extending between the ridges corresponding to polymer leaflets, wherein an edge on the mandrel separates the top surface and the contoured surfaces, with the mandrel edge corresponding to the free edge of the leaflets.

2. The mandrel of claim 1 wherein the mandrel comprises three ridges connected by three scallops to form three contoured surfaces.

3. The mandrel of claim 1 wherein the mandrel edge has a radius of curvature of no more than about 0.25 millimeters.

4. The mandrel of claim 1 wherein the mandrel edge has a radius of curvature of no more than about 0.15 millimeters.

5. The mandrel of claim 1 wherein the angle between the top surface and the contoured surfaces is no larger than about 135 degrees.

6. The mandrel of claim 1 wherein the angle between the top surface and the contoured surfaces is no larger than about 90 degrees.

7. The mandrel of claim 1 wherein the top surface of the mandrel is flat.

8. The mandrel of claim 1 wherein the top surface of the mandrel has flat portions and curved portions.

9. The mandrel of claim 1 wherein the top surface of the mandrel has flat portions adjacent the edge and a protruding portion away from the edge.

10. The mandrel of claim 1 wherein the contoured surfaces are on an outside surface of the mandrel.

11. The mandrel of claim 1 wherein the contoured surfaces are on an interior surface of the mandrel.

12. A method for producing polymer leaflets for a polymer valve prosthesis, the method comprising:

forming a polymer structure by dip coating a mandrel into a polymer liquid, the mandrel having a top surface and an outer surface comprising a plurality of ridges and contoured surfaces extending to the ridges, wherein an edge on the mandrel separates the top surface and the contoured surface with the mandrel edge corresponding to the free edge of the leaflets.

13. The method of claim 12 wherein the radius of curvature of the edge between the top of the mandrel and the contoured surfaces is no more than about 0.25 millimeters.

14. The method of claim 12 wherein the angle between the top surface and the contoured surface is no larger than 135 degrees.

15. The method of claim 12 wherein the mandrel comprises three ridges connected by three scallops to form three contoured surfaces that result in three leaflets.

16. The method of claim 12 wherein liquid polymer is a polymer solution.

17. The method of claim 12 wherein the liquid polymer comprises a polymer melt.

18. The method of claim 12 wherein the polymer liquid comprises a polymer selected from the group consisting of polyamides, polyesters, polyacrylates, polyethylenes, polytetrafluoroethylenes, polypropylenes, ethylene-propylene copolymers, ethylene-propylene-diene monomer copolymers, polyvinylchlorides, polycarbonates, polyacetals, polyurethanes, polydimethyl siloxanes,

cellulose acetates, ethylene vinyl acetates, polysulfones, nitrocelluloses, silicones, and derivatives, mixtures and copolymers thereof.

19. The method of claim 12 wherein the polymer liquid comprises a polymer selected from the group consisting of polyurethanes, silicones, polydimethyl siloxane, polytetrafluoroethylene, derivatives thereof and mixtures thereof.

20. The method of claim 12 further comprising separating the polymer structure along the edge to form leaflets having the shape of the contoured surfaces.

21. The method of claim 20 wherein the separating is performed by removing the polymer on the top of the mandrel.

22. The method of claim 12 wherein a support is located over the mandrel prior to performing the dip coating, the polymer structure being formed over the support.

23. The method of claim 22 wherein the support comprises commissure supports that are positioned adjacent to the ridges.

24. The method of claim 22 wherein the support is a stent.

25. The method of claim 12 wherein the dip coating is performed with multiple dips of the mandrel into one or more polymer liquids.

26. The method of claim 25 wherein the multiple dips of the mandrel are performed with at least one dip into a first polymer liquid and at least one dip into a second polymer liquid, the first polymer liquid and the second polymer liquid having different compositions.

27. The method of claim 25 wherein a reinforcement material is placed over a polymer layer prior to a subsequent dip into a polymer liquid.

28. A method of forming a valved prosthesis comprising:

forming a polymer structure using the method of claim 12; and

securing the polymer leaflets onto a leaflet support structure.

29. A mandrel comprising an outer surface having a plurality of ridges and contoured surfaces extending between the ridges corresponding to polymer leaflets in a closed configuration, wherein contoured surfaces corresponding to the leaflets meet contoured surfaces of adjacent leaflets at a sharp edge.

Sub C'

add A'